

The claims defining the invention are as follows:

1. A method for verifying the speed of a vehicle having at least a front axle and a rear axle using sensors, the sensors being separated by a distance, the
5 method including the following steps:

- (a) sensing a presence of the vehicle;
- (b) recording an image of the vehicle to enable the vehicle to be identified;
- (c) triggering the sensors to emit a signal;
- (d) receiving the signals emitted by the sensors;
- 10 (e) determining the speed of the vehicle; and
- (f) determining a wheel base measurement for the vehicle;

wherein said determined wheel base measurement is compared to an actual wheel base measurement of the vehicle being sensed and any discrepancy between them is indicative of potential errors in the speed of the
15 vehicle determined by the method.

2. A method according to claim 1, wherein the speed of the vehicle is determined by a method including the following steps:

- (a) measuring a first time interval between the front axle triggering a signal in
20 the first sensor and the front axle triggering a signal in the second sensor;
- (b) measuring a second time interval between the rear axle triggering a signal in the first sensor and the rear axle triggering a signal in the second sensor;
- (c) computing the speed of the front axle relative to the distance separating
25 the first and second sensors and the first time interval; and
- (d) computing the speed of the rear axle relative to the distance separating the first and second sensors and the second time interval.

3. A method according to claim 2, wherein two independent wheel base measurements are determined by a method including the following steps:

- (a) measuring a third time interval between the front axle triggering a signal in the second sensor and the rear axle triggering a signal in the first sensor;
- (b) computing a first wheel base measurement for the vehicle relative to the first and third time intervals and the distance; and

(c) computing a second wheel base measurement for the vehicle relative to the second and third time intervals and the distance.

4. A method according to anyone of claims 1 to 3, further including the step
5 of counting the signals triggered by the first and second sensors by each vehicle, wherein the number of signals triggered in each sensor is used to determine a number of axles associated with the vehicle and the number of the axles determined is compared to an actual number of axles in the vehicle being sensed such that any discrepancy between them is indicative of potential errors
10 in the speed of the vehicle determined by the method.

5. A method according to any one of claims 1 to 4, further including the step of periodically calibrating the system by injecting into the system signals simulating sensor signals for a known vehicle speed and comparing the
15 determined vehicle speed with the known vehicle speed.

6. A method for verifying the speed of a vehicle having at least a front axle and a rear axle using sensors, the sensors being separated by a distance, the method including the following steps:

- 20 (a) sensing a presence of the vehicle;
(b) recording an image of the vehicle to enable the vehicle to be classified according to type;
(c) triggering the sensors to emit a signal;
(d) receiving the signals emitted by the sensors;
25 (e) determining the speed of the vehicle;
(f) determining a wheel base measurement for the vehicle; and
(g) providing a database containing data relating to various vehicle types associated with vehicle specifications including a validated wheel base measurement for each vehicle type;

30 wherein the wheel base measurement determined by the method is compared to the validated wheel base measurement stored in the database and any discrepancy between them is indicative of potential errors in the speed of the vehicle determined by the method.

7. A method according to claim 6, wherein the speed of the vehicle is determined by a method including the following steps:

- (a) measuring a first time interval between the front axle triggering a signal in the first sensor and the front axle triggering a signal in the second sensor;
- 5 (b) measuring a second time interval between the rear axle triggering a signal in the first sensor and the rear axle triggering a signal in the second sensor;
- (c) computing the speed of the front axle relative to the distance separating the first and second sensors and the first time interval; and
- 10 (d) computing the speed of the rear axle relative to the distance separating the first and second sensors and the second time interval.

8. A method according to claim 7, wherein two independent wheel base measurements are determined by a method including the following steps:

- 15 (a) measuring a third time interval between the front axle triggering a signal in the second sensor and the rear axle triggering a signal in the first sensor;
- (b) computing a first wheel base measurement for the vehicle relative to the first and third time intervals and the distance; and
- (c) computing a second wheel base measurement for the vehicle relative to
- 20 the second and third time intervals and the distance.

9. A method according to anyone of claims 6 to 8, further including the step of counting the signals triggered by the first and second sensors by each vehicle, wherein the number of signals triggered in each sensor is used to

25 determine a number of axles associated with the vehicle and the number of the axles determined is compared to a validated number of axles stored in the database for the detected vehicle type such that any discrepancy between them is indicative of potential errors in the speed of the vehicle determined by the method.

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10. A method according to any one of claims 6 to 9, further including the step of periodically calibrating the system by injecting into the system signals simulating sensor signals for a known vehicle speed and comparing the determined vehicle speed with the known vehicle speed.

11. A system for verifying the speed of a vehicle having at least a front and rear axle, the system including:

- 5 (a) a camera for recording an image of the vehicle to enable the vehicle to be identified;
- (b) at least two sensors separated by a distance which are triggered to emit a signal by the front and rear axles;
- (c) means for receiving the signals emitted by the sensors;
- (d) means for using the signals to determine the speed of the vehicle; and
- 10 (e) means for using the signals to determine a wheel base measurement for the vehicle;

wherein the wheel base measurement determined by the system is compared to an actual wheel base measurement and any discrepancy between them is indicative of potential errors in the speed of the vehicle determined by the system.

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12. A system according to claim 11, wherein the means for determining the speed of the vehicle includes:

- 20 (a) means for determining a first time interval between the front axle triggering a signal in the first sensor and the front axle triggering a signal in the second sensor;
- (b) means for determining a second time interval between the rear axle triggering a signal in the first sensor and the rear axle triggering a signal in the second sensor;
- 25 (c) means for computing the speed of the front axle relative to the distance separating the first and second sensors and the first time interval; and
- (d) means for computing the speed of the rear axle relative to the distance separating the first and second sensors and the second time interval.

30 13. A system according to claim 11 or 12, wherein two independent wheel base measurements are determined for each vehicle.

14. A system according to any one of claims 11 to 13, wherein the means for determining the wheel base measurements for the vehicle includes:

(a) means for determining a third time interval between the front axle triggering a signal in the second sensor and the rear axle triggering a signal in the first sensor; and

(b) means for computing a first wheel base measurement for the vehicle
5 relative to the first and third time intervals and the distance; and

(c) means for computing a second wheel base measurement for the vehicle
relative to the second and third time intervals and the distance.

15. A system according to any one of claims 11 to 14, further including
10 means for counting the signals triggered by the first and second sensors by
each vehicle, wherein the number of signals triggered in each sensor is used to
determine a number of axles associated with the vehicle and the number of
axles determined is compared to an actual number of axles in the vehicle being
sensed such that any discrepancy between them is indicative of potential errors
15 in the speed of the vehicle determined by the system.

16. A system according to any one of claims 11 to 15, further including
means for injecting into the system signals simulating sensor signals for a
known vehicle speed and comparing the determined vehicle speed with the
20 known vehicle speed to calibrate the system.

17. A system for verifying the speed of a vehicle having at least a front and
rear axle, the system including:

(a) a camera for recording an image of the vehicle to enable the vehicle to
25 be classified according to type;

(b) at least two sensors separated by a distance which are triggered to emit
a signal by the front and rear axles;

(c) means for receiving the signals emitted by the sensors;

(d) means for using the signals to determine the speed of the vehicle;

30 (e) means for using the signals to determine a wheel base measurement for
the vehicle; and

(f) a database containing data relating to various vehicle types associated
with vehicle specifications including a validated wheel base measurement for
each vehicle type;

wherein the wheel base measurement determined by the system is compared to the validated wheel base measurement stored in the database and any discrepancy between them is indicative of potential errors in the speed of the vehicle determined by the system.

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18. A system according to claim 17, wherein the means for determining the speed of the vehicle includes:

(a) means for determining a first time interval between the front axle triggering a signal in the first sensor and the front axle triggering a signal in the second sensor;

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(b) means for determining a second time interval between the rear axle triggering a signal in the first sensor and the rear axle triggering a signal in the second sensor;

(c) means for computing the speed of the front axle relative to the distance separating the first and second sensors and the first time interval; and

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(d) means for computing the speed of the rear axle relative to the distance separating the first and second sensors and the second time interval.

20 19. A system according to claim 17 or 18, wherein two independent wheel base measurements are determined for each vehicle.

20. A system according to any one of claims 17 to 19, wherein the means for determining a wheel base measurement for the vehicle includes:

25 (a) means for determining a third time interval between the front axle triggering a signal in the second sensor and the rear axle triggering a signal in the first sensor;

(b) means for computing a first wheel base measurement for the vehicle relative to the first and third time intervals and the distance; and

30 (c) means for computing a second wheel base measurement for the vehicle relative to the second and third time intervals and the distance.

21. A system according to any one of claims 17 to 20, further including means for counting the signals triggered by the first and second sensors by

each vehicle wherein the number of signals triggered in each sensor is used to determine a number of axles associated with the vehicle and the number of axles determined is compared to a validated number of axles stored in the database for the detected vehicle type such that any discrepancy between them is indicative of potential errors in the speed of the vehicle determined by the system.

22. A system according to any one of claims 17 to 21, further including means for injecting into the system signals simulating sensor signals for a known vehicle speed and comparing the determined vehicle speed with the known vehicle speed to calibrate the system.

23. A system for verifying the speed of a vehicle having at least a front and rear axle, the system including:

- (a) a camera for recording an image of the vehicle to enable the vehicle to be classified according to type;
- (b) at least two sensors separated by a distance which are triggered to emit a signal by the front and rear axles;
- (c) means for receiving the signals emitted by the sensors;
- (d) means for using the signals to determine the speed of the vehicle;
- (e) means for using the signals to determine the number of axles for the vehicle; and
- (f) a database containing data relating to various vehicle types associated with vehicle specifications including a validated number of axles for each vehicle type;

wherein the axle count determined by the system is compared to the validated axle count stored in the database and any discrepancy between them is indicative of potential errors in the speed of the vehicle determined by the system.

24. A system according to any one of claims 17 to 23 wherein the database includes an expert system whereby axle counts and/or wheelbase measurements for vehicle types are learned from measurements made by the system and then added to the database.

25. A method of calibrating a vehicle speed determination system using at least two sensors separated by a distance, the vehicle having at least a front and a rear axle, the method including the steps of:

- 5 (a) sensing a presence of the vehicle;
- (b) recording an image of the vehicle to enable the vehicle to be classified according to type;
- (c) triggering the sensors to emit a signal;
- (d) receiving the signals emitted by the sensors;
- 10 (e) determining the speed of the vehicle;
- (f) determining a wheel base measurement for the vehicle;
- (g) providing a database containing data relating to various vehicle types associated with vehicle specifications including a validated wheel base measurement for each vehicle type;
- 15 (h) comparing the wheel base measurement determined by the system to the validated wheel base measurement; and
- (i) maintaining a register of speed and wheel base measurement data and discrepancies from validated wheel base measurement data;

wherein analysis of any discrepancies between the determined wheel
20 base measurement data and the validated wheel base measurement data is used to determine error trends and enable system calibration.